REMARKS

Claims 1, 2, 7, 20, 21, 28 and 32 have been amended. Claims 6 and 15-18 have been cancelled. Accordingly, claims 1-5, 7-14, and 19-32 remain in the application.

35 U.S.C. 112 Second Paragraph Rejection

Claims 1-32 were rejected by the Examiner for reciting the term "reduced." As suggested by the Examiner the term "reduced" has been removed from claims 1, 21, 28 and 32 as indicated above. Accordingly, Applicant respectfully requests that the subject rejection be withdrawn with respect to claims 1-5, 7-11, 21-27, and 28-32. With respect to claims 12-14, 19, and 20, these claims do not recite the term "reduced." Accordingly, Applicant respectfully requests that the subject rejection be withdrawn with respect to these claims as well.

35 U.S.C. 102(b) rejections

It is well settled that in order to establish that a claim is anticipated by an earlier reference that:

> TO ANTICIPATE A CLAIM, THE REFERENCE MUST TEACH EVERY ELEMENT OF THE CLAIM
> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required. In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).
> M.P.E.P. Section 2131 (emphasis in original).

Thus, if a cited reference fails to describe all of the elements and limitations of a claim, then rejection of that claim as being anticipated by that reference is improper.

The Examiner rejected claims 1, 15-18 and 32 under 35 U.S.C. 102(b) as being anticipated by Nishi et al. (U.S. Patent No. 4,976,918). As indicated above, claims 15-18 have been cancelled.

Claim 1, as amended, reads as follows:

1. An aluminum based alloy, said alloy comprising:
1.0 - 2.0% by weight manganese;
a maximum of 0.6% by weight iron;
0.001% to 0.003% by weight beryllium; and
the remainder being aluminum. (Emphasis added.)

Accordingly the Examiner will appreciate that the aluminum based alloy of claim 1 includes **0.001% to 0.003% by weight beryllium.** As acknowledged by the Examiner, Nishi et al. do not teach an aluminum based alloy that contains beryllium. Accordingly, Nishi et al. does not anticipate claim 1, and the Applicant respectfully requests that the rejection be withdrawn.

Claim 32, as amended, reads as follows:

32. A method of producing components by die casting an aluminum alloy, the method comprising the steps of:

providing an aluminum alloy **having magnesium, zinc, silicon, copper, beryllium, titanium, nickel, and tin** present in percentages by weight consistent with a known aluminum alloy;

maintaining the iron content of the provided alloy at or below the iron content of the known aluminum alloy;

adjusting the manganese content of the alloy to between 1.0-2.0% by weight;
heating the alloy to a temperature conducive to die casting;
casting a component from the alloy; and
removing the cast component from the die. (Emphasis added.)

The Examiner will appreciate that the method of claim 32 includes providing an aluminum alloy that has **magnesium, zinc, silicon, copper, beryllium, titanium, nickel, and tin.** Nishi et al.

does not teach an aluminum alloy that includes **magnesium, zinc, silicon, copper, beryllium, titanium, nickel, and tin.** Accordingly, Nishi et al. does not anticipate claim 32, and the Applicant respectfully requests that the rejection be withdrawn.

If after considering the above discussion, the Examiner maintains the subject rejection of claim 32 the Applicant respectfully requests that the Examiner point out with particularity (i.e. by column and line number) where Nishi et al. teaches an aluminum alloy that includes **magnesium, zinc, silicon, copper, beryllium, titanium, nickel, and tin.**

35 U.S.C. 103(a) rejections

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See M.P.E.P. Section 2143 - Section 2143.03 for decisions pertinent to each of these criteria. M.P.E.P. § 2142.

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

The Examiner rejected claims 2-6, 12-14, 19, and 20 under 35 U.S.C. 103 (a) as being unpatentable over Nishi et al. in view of Evans et al. (U.S. Patent No. 5,573,606).

Claim 2, as amended, reads as follows;

2. The aluminum alloy of claim 1 further comprising 2.5 - 4.0% by weight magnesium **said alloy characterized by an elongation value of at least 17%.** (Emphasis added.)

Accordingly the Examiner will appreciate that (i) claim 2 includes claim 1 as a base claim, and thus also recites the limitation that the defined alloy includes 1.0 - 2.0% by weight manganese and 0.001% to 0.003% by weight beryllium and (ii) the defined alloy has an elongation value of at least 17%.

The Examiner acknowledges that Nishi et al. does not teach or suggest an **alloy characterized by an elongation value of at least 17%.** The Examiner attempts to correct this deficiency by arguing that Evans et al. teach aluminum alloys having **similar** compositions as the ones defined by the rejected claims, and these compositions have elongation values over 20%. Based upon this argument the Examiner concludes that the aluminum alloys of the rejected claims are obvious in light of the relied upon Nishi et al./ Evans et al. combination. Applicant respectfully disagrees.

With respect to the teachings of Evans et al., it appears that the Examiner specifically relies on the data set forth in the Table in column 7 to support his reasoning. This Table is set forth below for the Examiner's convenience.

Alloy	SI	FE	MN	MG	CU	TI	UTS (kgf/mm^2)	YS (kgf/mm^2)	ELONG (%)
#1	0.20	0.25	0.25	2.75	0.07	0.00	22.5	12.0	23.5
#2	0.20	0.25	0.60	2.83	0.07	0.04	23.2	12.3	22.7
#3	0.20	0.60	0.60	2.83	0.07	0.00	23.9	13.2	17.0
#4	0.45	0.60	0.60	2.79	0.06	0.00	24.6	14.1	14.3
#5	0.20	0.60	0.25	2.77	0.07	0.04	23.2	13.2	18.0
#6	0.45	0.60	0.25	2.80	0.07	0.04	23.9	13.9	13.6
#7	0.45	0.25	0.25	2.79	0.07	0.04	24.6	14.1	15.8
#8	0.45	0.25	0.60	2.77	0.07	0.00	25.3	15.1	13.3

As shown above, this Table does not teach any alloy that contains 0.001% to 0.003% by weight beryllium. In addition, this Table does not teach any alloy that contains 1.0% - 2.0% by weight manganese (Mn). Applicant understands that the subject Table does disclose alloys that contain 0.25% Mn or 0.60% Mn. However, the Examiner should appreciate that going from an alloy that contains 0.60% Mn as taught by Evans et al. in the subject Table, to one that contains 1.0% Mn

as recited by the lowest value in the range set forth in claim 2, still represents approximately a **67% increase** in the amount of Mn contained in the alloy taught by Evans et al. In light of this discussion Applicant respectfully submits that the Examiner's assertion that the compositions taught by Evans et al. and those defined by claim 2 are "similar" is incorrect. In fact, Applicant submits that the compositions taught by Evans et al. are substantially different from those defined by claim 2, e.g. (i) the compositions defined by claim 2, at the very least, contain approximately 67% more Mn than those disclosed by Evans et al., (ii) the compositions described in the subject Table do not contain beryllium and (iii) several of the compositions described in Evans et al. have elongation values well below 17%, e.g. elongation values of 14.3, 13.6, 15.8, and 13.3. Therefore, the Evans et al. compositions are not similar to those defined by claim 2 to the degree asserted by the Examiner.

In addition, Applicant respectfully points out that Nishi et al. fails to teach or suggest compositions similar to those defined by claim 2 which have an elongation value of at least 17%. In particular, the Examiner's attention is directed to Tables 2, 4, and 10 of Nishi et al. These Tables are set forth below for the Examiner's convenience.

TABLE 2						
Sample No.	Tensile strength (kgf/mm^2)	Tensile test yield point (kgf/mm^2)	Elongation (%)	Impact value (kgm/cm^2)	Hardness Hv (200 g)	Remarks
1	25.4	14.6	14.9	-	79	Comparison
2	29.2	16.2	8.2	3.0	96	"
3	31.9	17.3	10.8	-	91	"
4	35.7	19.3	9.7	2.2	120	Present Invention
5	34.4	18.7	7.5	-	105	Present Invention
6	36.8	22.4	3.0	1.5	137	Comparison
7	33.2	19.0	7.9	2.8	113	Present Invention
8	31.7	15.7	16.7	5.9	105	Comparison
9	35.8	20.9	3.9	1.5	135	"
10	37.1	22.0	4.4	1.3	152	Present Invention
11	33.9	18.5	11.8	3.2	108	Present Invention
12	34.2	18.6	13.5	3.7	121	Present Invention
13	33.7	18.7	8.6	2.7	114	Present Invention
14	35.7	19.6	7.7	2.5	122	Present Invention
15	34.8	19.0	7.3	2.2	123	Present Invention
16	36.9	22.0	1.9	-	142	Comparison
17	23.7	12.2	15.7	-	71	"
18	36.1	23.0	2.6	1.0	134	"
19	33.8	23.4	1.5	-	130	"
Commercial Alloy ADC10	30.5~ 32.6	17.6	1.5~ 4.0	0.9~ 1.0	80~100	Reference
Commercial	30.6	17.8	7.2	2.2	93	

TABLE 4

Sample No.	Tensile Strength			Vickers hardness (Hv)	Charpy impact value ($kgf.m/cm^2$)	Remarks
	Tensile strength (kgf/mm^2)	0.2% Yield strength (kgf/mm^2)	Elongation (%)			
1	27.5	16.6	13.9	81	3.46	Comparison
2	32.6	19.5	11.5	103	3.28	Present Invention
3	34.5	20.3	10.8	117	2.61	Present Invention
4	36.5	22.7	4.1	121	0.64	Comparison
5	31.5	19.5	11.6	86	3.23	"
6	34.2	20.1	10.2	115	3.01	Present Invention
7	31.6	21.2	4.2	114	1.56	Comparison
8	28.1	10.9	13.6	83	3.49	"
9	32.1	19.8	12.0	103	3.34	Present Invention
10	35.1	20.8	8.2	120	2.50	Present Invention
11	36.9	23.0	3.9	123	0.63	Comparison
12	34.5	19.9	0.1	100	1.92	"
13	31.7	19.2	11.1	87	3.31	"
14	34.6	20.1	10.0	117	2.92	Present Invention
15	31.4	21.5	4.1	118	1.63	Comparison
ADC10	30.5~ 32.6	17.6	1.5~ 4	80~ 100	0.9~ 1.0	Reference
Alloy disclosed in Jap. Pat. Publn. No. 43539/84	26~ 29.5	12~ 14	6~ 9	81~ 86	1.63~ 1.68	Reference

TABLE 10						
Sample No.	Test results					
	Tensile strength (kgf/mm^2)	Tensile test yield point (kgf/mm^2)	Elongation (%)	Modulus (as reference) (kgf/mm^2)	Hardness Hv (200 g)	Remarks
1	31.9	16.9	14.0	7023	101	Present Invention
2	34.2	18.4	12.1	6648	118	Present Invention
3	35.2	20.0	9.5	6870	109	Present Invention
4	35.1	19.9	8.7	7119	113	Present Invention
5	31.4	17.9	9.7	7142	97	Present Invention
6	30.8	17.6	10.9	7059	102	Present Invention
7	30.8	17.0	10.0	6892	102	Present Invention
8	26.5	13.9	16.0	7329	90	Comparison
9	29.1	15.6	13.1	6819	101	"
10	28.9	17.4	5.5	7361	99	"
11	30.7	16.3	16.5	6849	89	"
Commercial	25.0~	11.2~	7.5~	6870	74	Reference
Alloy	26.5	14.8	10			
ADC6						
Commercial	30.5~	17.6	1.5~	7240	80~	"
Alloy	32.6		4		100	
ADC10						

As shown above, none of the alloys set forth in Tables 2, 4, and 10 of the Nishi et al. reference have an elongation value of at least 17%. In fact, most of the elongation values reported in these Tables are well below 17%.

Therefore, in light of the above discussion, neither the Nishi et al. compositions or the Evans et al. compositions are similar to those defined by claim 2 to a degree that one of ordinary skill in the art would simply expect or assume that the claimed alloys would have an elongation value of at least 17% in light of these relied upon references.

Applicants also respectfully direct the Examiner's attention to the following passage of the Evans et al. reference:

Col. 1, lines 56-66

> The effects of various elements on the mechanical properties of aluminum alloys have been studied, however, the investigations have been conducted mostly on relatively simple systems, binary or ternary alloys. Most commercial aluminum die casting alloys are complex alloy systems containing several alloy and impurity elements. The large number of elements encountered in these alloys, their low, varying concentrations and the possibility of interactions between the alloy elements, makes the systematic study of the effect of the individual elements on the properties of commercial alloys very complicated and difficult.

As stated above in the Evans et al. reference, the large number of elements encountered in these alloys, their low, varying concentrations and the possibility of interactions between the alloy elements, **makes the systematic study of the effect of the individual elements on the properties of commercial alloys very complicated and difficult**. Accordingly, once again, contrary to the Examiner's assertion, one of ordinary skill in the art would **not** simply expect or assume that an alloy of claim 2 would have an elongation value of at least 17% based upon the teachings of Evans et al. and Nishi et al. This is particularly true when one realizes that (i) the alloys of claim 2 contain, at a minimum, approximately 67% more Mn than those disclosed by Evans et al. in the relied upon Table and (ii) several of the compositions described by Evans et al. have elongation values less than 17%.

Applicants further direct the Examiner's attention to the following passages of the Evans et al. reference.

Col. 1, lines 5-15

> The present invention relates to an aluminum base die casting alloy having substantially improved mechanical properties, and a method for making die cast products from the alloy More particularly the improved aluminum based allow comprises 2.5-4.0% by weight magnesium, **a maximum of 0.4% by weight manganese,** a maximum of 0.6% by weigh iron, a maximum of 0.45% by weight silicon, a maximum of 0.10% by weight copper, less than 0.003% by weight beryllium with the remainder being aluminum. This aluminum alloy is particularly useful for

die casting light weight automobile component parts. (Emphasis added.)

Col. 2, lines 36-46

Iron is typically added to die casting aluminum alloys for the purpose of preventing the aluminum alloy from sticking to a metal die during the course of the die casting operation and enhancing the release of the aluminum alloy from the die. However, the addition of iron will lower the elongation of the aluminum alloy. Manganese is added to aluminum alloys for the purpose of eliminating the adverse effect of the addition of iron. **However, an excess of manganese can result in a lowering of the mechanical strength of the aluminum alloy**. (Emphasis added.)

Col. 3, lines 9-19

Applicants' present invention is directed to a die casting aluminum alloy having improved elongation and comprising 2.5-4.0% by weight magnesium, **a maximum of 0.4% by weight manganese**, a maximum of 0.6% by weight iron, a maximum of 0.45% by weight silicon, a maximum of 0.10% by weight copper, less than 0.003% by weight beryllium with the remainder being aluminum. This aluminum alloy is useful for forming light weight die cast articles having superior elongation over die cast articles formed from currently available aluminum die cast alloys. (Emphasis added.)

Col. 3, line 66 - Col. 4, lines 1-5

A preferred embodiment in accordance with the present invention comprises 2.5-4.0% by weight magnesium of 0.10% by weight zinc, **a maximum of 0.4% by weight manganese,** a maximum of 0.6% by weight iron, a maximum of 0.45% by weight silicon, a maximum of 0.10% by weight copper, less than 0.003% by weight beryllium with the remainder being aluminum. (Emphasis added.)

In light of the above passages the Examiner will appreciate that Evans et al. (i) explicitly teaches that an excess of **manganese can result in a lowering of the mechanical strength of the aluminum alloy** and (ii) explicitly teaches that the **maximum** amount of manganese that should be added to an alloy is 0.4%. Accordingly, Applicant respectfully submits that Evans et al. provides **no motivation** for one of ordinary skill to add manganese to an aluminum alloy in an

amount greater than 0.4%. The Examiner is reminded that the composition of claim 2 contains manganese at a level of 1.0 - 2.0% by weight.

In light of the above discussion Applicant respectfully submits that the Examiner has not established a prima facie case of obviousness. In particular, the Examiner has not set forth a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the relied upon references. Accordingly, the Applicant respectfully requests that the rejection of claim 2 be withdrawn.

If after considering the above discussion the Examiner maintains the subject rejection of claim 2, the Applicant respectfully requests that the Examiner set forth, with particularity, a convincing line of reasoning as to why an artisan would have found the invention of claim 2 to have been obvious in light of the teachings of Nishi et al. and Evans et al. Applicant respectfully submits that simply stating that one of ordinary skill in the art would have expected an elongation value of at least 17% based upon an alleged undefined similarity between the compositions of the relied upon references and claim 2 is not sufficient to establish a proper prima facie case of obviousness.

With respect to claims 3-5, each of these claims include the limitation that the alloy has an elongation value of at least 17%. In addition, each of these claims also define compositions which include manganese at a level of 1.0 - 2.0% by weight. Accordingly, the above discussion with respect to claim 2 also applies to claims 3-5. Therefore, the Applicant also respectfully requests that the rejection of these claims also be withdrawn.

Now turning to claim 12, this claim reads as follows:

12. An aluminum based alloy for use in forming a die cast product, said alloy having an elongation value of at least 17%, said alloy comprising

2.5 - 4.0% by weight magnesium;

1.0 - 2.0% by weight manganese;

0.25 - 0.6% by weight iron;

0.2 - 0.45% by weight silicon;

less than 0.003% by weight beryllium;

the remainder being aluminum.

Accordingly, this claim also defines compositions that have an elongation value of at least 17% and include 1.0 - 2.0% by weight manganese. Therefore, the above discussion with respect to claim 2 also applies to claim 12. Thus, the Applicant also respectfully requests that the rejection of this claim also be withdrawn.

Each of claims 13 and 14 include claim 12 as a base claim. Therefore, the above discussion with respect to claim 12 also applies to claims 13 and 14. Thus, the Applicant also respectfully requests that the rejection of these claims also be withdrawn.

With respect to claim 19, this claim reads as follows:

19. A structural article of manufacture comprising an aluminum alloy having a yield strength of greater than or equal to 11.95 kgf/mm^2 and an elongation value of greater than or equal to 18%, said aluminum alloy comprising

2.5 - 4.0% by weight magnesium;
1.0 - 2.0% by weight manganese;
a maximum of 0.6% by weight iron;
a maximum of 0.45% by weight silicon;
a maximum of 0.10% by weight copper;
less than 0.003% by weight beryllium;
the remainder being aluminum.

Accordingly, this claim defines compositions that have an elongation value of at least 18% and include 1.0 - 2.0% by weight manganese. Therefore, the above discussion with respect to claim 2 also applies to claim 19. Thus, the Applicant also respectfully requests that the rejection of this claim also be withdrawn.

Claim 20 includes claim 19 as a base claim. Therefore, the above discussion with respect to claim 19 also applies to claim 20. Thus, the Applicant also respectfully requests that the rejection of these claims also be withdrawn.

The Examiner rejected claims 7-11 and 28-31 under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Evans et al. and further in view of Witters et al. (U.S. Patent No. 5,151,136).

Claim 7 as amended reads as follows:

7. The aluminum alloy of claim 1 further comprising less than 1.75% by weight magnesium and wherein said alloy has an elongation value of at least 17%.

Accordingly, this claim defines compositions that have an elongation value of at least 17% . Therefore, the above discussion with respect to claim 2 also applies to claim 7. Thus, the Applicant also respectfully requests that the rejection of this claim also be withdrawn.

With respect to claims 8-11, each of these claims include the limitations of claim 7, thus the discussion of claim 7 is pertinent to each of claims 8-11. Therefore the Applicant requests that the rejection of these claims also be withdrawn.

Claim 28 as amended reads as follows:

28. A die-castable aluminum alloy comprising:

0.15-0.35% by weight magnesium

1.0 - 2.0% by weight manganese;

a maximum of 0.1% by weight iron;

4.2-5.0% by weight copper;

a maximum of 0.2% by weight each of additional elements selected from the group consisting of zinc, silicon, nickel, tin, and titanium; and

the remainder being aluminum, wherein said alloy has an elongation value of at least 17% .

Accordingly, this claim also defines compositions that have an elongation value of at least 17% . Therefore, the above discussion with respect to claim 2 also applies to claim 28. Thus, the Applicant also respectfully requests that the rejection of this claim also be withdrawn.

With respect to claims 29-31, each of these claims include the limitations of claim 28, thus the discussion of claim 28 is pertinent to each of claims 29-31. Therefore the Applicant requests that the rejection of these claims also be withdrawn.

Claim 21 as amended reads as follows:

21. A die-castable aluminum alloy comprising:

0.25-0.70% by weight magnesium

1.0 - 2.0% by weight manganese;

a maximum of 0.2% by weight iron;

6.5-7.5% by weight silicon;

a maximum of 0.2% by weight each of additional elements selected from the group consisting of zinc, copper and titanium; and

the remainder being aluminum, wherein said alloy has an elongation value of at least 17% .

This claim also defines compositions that have an elongation value of at least 17% . Therefore, the above discussion with respect to claim 2 also applies to claim 21. Thus, the Applicant also respectfully requests that the rejection of this claim also be withdrawn.

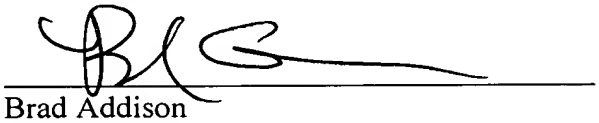
With respect to claims 22-25 and 27, each of these claims include the limitations of claim 21, thus the discussion of claim 21 is pertinent to each of claims 22-24 and 27. Therefore the Applicant requests that the rejection of these claims also be withdrawn.

The Commissioner is hereby authorized to charge any additional fees which may be required for this amendment, or credit any overpayment, to Deposit Account No. 10-0435, in reference to 3847-67823.

In the event that an extension of time is required, or may be required in addition to that requested in the petition for extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time, or credit any overpayment for an extension of time, to Deposit Account No. 10-0435, in reference to 3847-67823.

In view of the above, it is submitted that the claims are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance of the pending claims at an early date is solicited.

Respectfully submitted,
BARNES & THORNBURG



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